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SWEETCLOVER PRODUCTION AND MANAGEMENT

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Sweetclover was introduced into the United States from south-eastern Asia in the early 1700s. As late as 1910 it was legislated against as a weed in some states.

We now know that sweetclover is valuable for hay, silage, pasture, seed, soil improvement, and as a source of nectar and pollen for honey bees.

ADAPTATION

Sweetclover is winterhardy, drought tolerant, and adapted to a wide range of soil and climatic conditions. It grows best on neutral or alkaline soils, and is one of the best legumes to grow on highly alkaline soils.

SWEETCLOVER SPECIES

In South Dakota two biennial species are of economic importance: white (*Melilotus alba*) and yellow (*Melilotus officinalis*). The yellow-flowered species blooms approximately 2 weeks earlier than the white-flowered one.

Yellow-flowered strains are also usually less upright, fine stemmed, more drought tolerant, and better adapted to the drier sections of South Dakota.

PLANTING GUIDELINES

A firm seedbed similar to that for alfalfa should be prepared when seeding sweetclover. The best time to plant is in the spring when moisture conditions are favorable for rapid seed germination and seedling establishment.

Late summer and fall seedings are not recommended, as the seedlings usually will not grow big enough to survive the winter.

Plant sweetclover seed at a rate of 10 to 15 lb pure live seed per acre at a depth of 1/2 inch. Inoculate before planting with Rhizobia bacteria to insure that atmospheric nitrogen will be fixed. The same inoculum used for alfalfa seed can also be used on sweetclover seed.

Sweetclover seed may contain a high proportion of "hard seed." The seedcoats of these seeds do not permit the uptake of water

required for germination, and the hard seeds may lie in the soil for several years before germinating.

Scarify all sweetclover seed before planting. This scars or scratches the seedcoats, providing an entry point for the water.

GROWTH CHARACTERISTICS

Growth during the seeding year is a moderate amount of top growth and a large amount of carbohydrate storage in the roots during the fall.

Because of the limited forage production, use seeding-year sweetclover only very lightly. Avoid close mowing or grazing, for it will reduce the plant's ability to store adequate food reserves and may result in winterkill or slow spring growth.

The second year's growth develops from crown buds which were formed during the fall of the seeding year. Carbohydrate reserves stored in the roots the previous fall are used to produce top growth and are not replaced. By midsummer the plant flowers, produces seed, and dies.

UTILIZATION AS PASTURE

Sweetclover contains a chemical compound known as coumarin. When livestock graze sweetclover, free coumarin is released. It tastes bitter and reduces palatability.

Livestock will consequently graze sweetclover sparingly when first turned onto it. They soon, however, become accustomed to the taste and graze without difficulty.

Grazing may begin on second-year sweetclover when new growth is 6 to 8 inches tall. When the plants are growing rapidly during May and June, the grazing pressure should be heavy enough to prevent the crop from becoming too stemmy and unpalatable.

Sweetclover should provide grazing for 60 to 90 days during the late spring and early summer.

Bloat is a potential problem when sweetclover is pastured. Feed

dry hay before grazing. Limit grazing time to give the animals a chance to adjust to the feed. Bloat-preventing materials are available in different feed forms. These products should be ingested on a regular basis for 3 days prior to and during the grazing period.

UTILIZATION AS HAY OR SILAGE

Sweetclover is not regarded as a good hay species because it tends to be stemmy. It should be harvested for hay at the late bud to early flower stage.

If a second cutting is planned, do not cut the first crop any lower than 6 inches, to leave live buds on the stubble. The older the plants are when the first harvest is made, the higher the stubble height should be to encourage regrowth.

Sweetclover hay should be dried to a moisture content of 16 to 18% because of the coumarin in the forage. In pasture, coumarin may only taste bitter. In excessively wet hay or silage, coumarin may be lethal. Sweetclover hay stored too wet will mold and may cause bleeding problems when fed.

For silage, sweetclover should also be harvested at late bud to early flower stage. The moisture content of the forage is a key factor in making good quality sweetclover silage. When stored in conventional upright or bunker silos, the moisture content should be approximately 65%. Sweetclover stored as haylage should be ensiled at a moisture content of 55 to 60%.

SWEETCLOVER DISEASE

Coumarin is concentrated in the leaves and flower buds. With excessive moisture in the hay or silage coumarin is converted to a toxic compound called dicoumarol. In the animal, dicoumarol interferes with Vitamin K, which is needed for the development of the prothrombin clotting factors.

Several days will pass before signs are noticed because clotting factors are already present in the animal. Clinical signs often include swelling from hemorrhage in body regions affected by trauma. An affected animal is pale and has strong heart beat and fast pulse. Blood may be noticed from body openings.

Treatment includes removal of the toxic agent and feeding good quality alfalfa hay. Replacing the Vitamin K, and possibly blood transfusions, may be required.

Vitamin K1 given at 1 mg/kg of body weight two to three times per day for 2 days is recommended. Vitamin K3 is not as easily utilized by the animal and is of little benefit

SOIL IMPROVEMENT

Sweetclover plowed down as a green manure crop can benefit succeeding crops and improve the drainage and tilth of the soil.

Sweetclover is generally plowed down in the spring of its second year when the plants are 6 to 10 inches tall. Data from Ohio show how much nitrogen is produced (Table 1).

Table 1. Average dry matter yield and nitrogen production of sweetclover at several harvest dates.

Date	Yield	Nitrogen produced
Seeding year		
July 1	515	18
September 1	1431	59
November 1	1616	113
Second year		
April 1	420	111
May 1	1930	114
June 1	4940	162

SEED PRODUCTION

Sweetclover is a prolific seed producer, with yields ranging from 100 up to 600 lb/A. The average seed yield from 1960 to 1970 in North Dakota was 245 lb/A.

One of the major problems encountered with seed harvesting is that shattering losses can be severe. The best stage at which to minimize shattering losses is when half of the seedpods have turned brown or black. Shattering losses will also be lower if the crop is windrowed first instead of being directly combined.

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